

# PHENIX WEEKLY PLANNING

TECHNICAL  
SUPPORT  
NO. 1



4/14/2011  
Don Lynch

This Week:

Brief access yesterday:

Replaced Aerogel Mainframe, Spare mainframe placed as well

Replaced Window washer cable

Continuing mechanical, electrical and gas system support for Run 11

Plan for shutdown 2011

Future upgrades support

## Next Week

No Scheduled Maintenance ?

Complete P-P run and switch to Au-Au 18 GeV

Continue Prep for FoCal prototype installation (waiting for prototype)

Continuing mechanical, electrical and gas system support for Run 11

Continue planning for shutdown 2011

Future upgrades support

# West Carriage liftable platforms ("window washer" platforms) Needs new cable, improved lockout method is desireable



Cable repaired this week,  
now we need to investigate  
improved lockout method-  
remote pin retractor



## AH and IR Crane Corrective Actions



IR Crane 1 ton replacement parts received. Paul and Mike R. planning for upgrade work.

AH Crane (both hooks) out of commission until repaired. CAD engineering evaluating options:

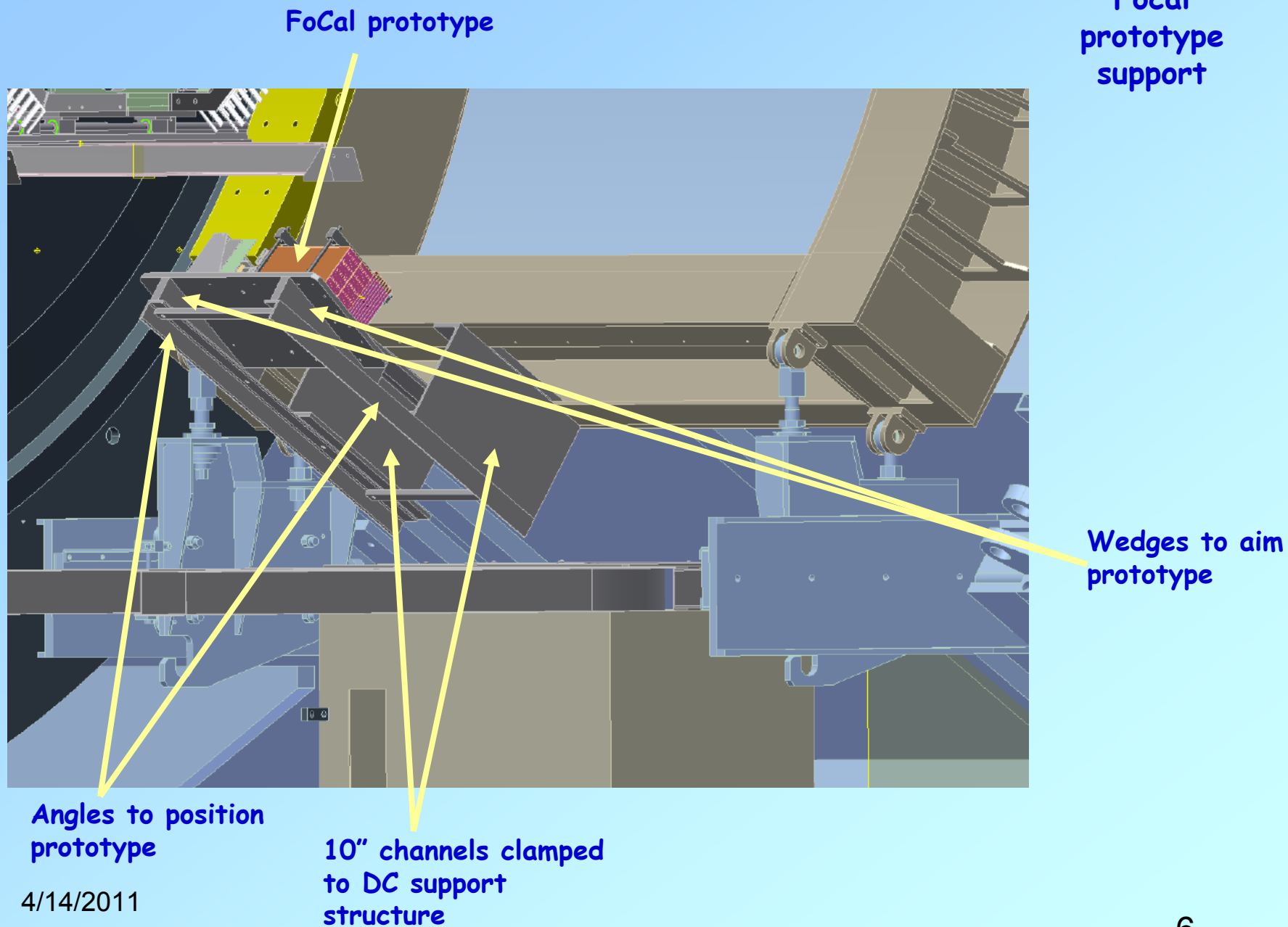
The Plan:

Remove speed reduction and use as originally equipped - unsafe?? - **By May 15 THEN...**



- B. Add bracketry to recertify as is - **Feasibility under review - Probably NO GO**
- C. New Drive - cost and lead time **Preferred**, but **can't be installed for this year**





4/14/2011

# Planning For the 2011 Shutdown

- Prep for shutdown 2/1-6/30/2011
  - Define tasks and goals
  - Analysis and design of fixtures, tools and procedures
  - Fabricate/procure tools and fixtures
  - Tests, mockups, prototypes
  - Receive, fabricate, modify, finish installables (bigwheels, tubing, etc.)
  - Review and approval of parts, tools, fixtures and procedures
  - Assembly and QA tests
- AH Crane temporary reconfiguration (crane out of service during reconfig) 4/15-5/15/2011
- Run 11 Ends 6/30/2010
- Shutdown Standard Tasks 7/1-7/21/2010
  - Open wall, disassemble wall, Remove MuID Collars,
  - Move EC to AH, etc.
- IR Crane repairs and upgrade 7/21-7/28
- Disassemble VTX services 7/11-7/22
- Remove VTX and transport to Chemistry Lab 7/25/2011
- BBC North maintenance 7/22-7/29/2011
- MuTr North Station 1 work 7/25-9/30/2011
  - Install access (scaffold) (1 week)
  - Disconnect Cables, hoses etc (1 week)
  - Remove FEE plates and chambers (1 week)
  - Station 2 Maintenance/upgrade through access opened by station 1 removal (3 weeks concurrent with next task)
  - Clean/install new parts and upgrades (3 weeks, concurrent)
  - Re-install chambers and FEE plates (1 week)
  - Re-cable, re-hose and test (3 weeks)

# Planning For the 2011 Shutdown (cont'd)

TECHNICAL SUPPORT ZONE

- VTX maintenance/upgrade and integration of FVTX onto VTX support structure 7/25-9/25/2011
  - Disassemble/repair/upgrade/test/reassemble VTX (3 weeks)
  - Resurvey as necessary (1 week)
  - Install FVTX (3 weeks)
  - VTX/FTX survey and QA tests (2 weeks)
- RPC1 and Absorber upgrades 7/25-10/28/2011
  - Install north absorbers (1 week)
  - Install north RPC1 (3 weeks)
  - Install south absorbers (1 week)
  - Install south RPC1 (3 weeks)
- Upgrade AH crane 8/15-9/15/2011
- DC/PC1 East troubleshooting (DC moved forward on rail for access) 9/15-10/15/2011
- Install VTX&FVTX (2 weeks) 9/26-10/7/2011
- Undefined detector subsystem maintenance and repairs 7/25-10/7/2011
- Prep for EC roll in 10/3-10/7/2011
- Roll in EC 10/10/2011
- Prep IR for run 10/10-10/17/2010
- VTX, FVTX and RPC1 Services and commissioning 9/16-10/31/201
- Pink/Blue/White sheets 10/17-10/31/201
- Run 12 cooldown 11/1/2011



## Tools/Fixtures Needed for Shutdown 2011

- FVTX/VTX modified assembly fixture - in progress
- FVTX inspection tool(s) - not yet specified
- Modified FVTX/VTX installation/transport fixture(s) - not yet specified
- RPC absorber assembly tool(s) - need absorber design first
- RPC absorber installation tool(s) - need absorber design first
- Station 1 North scaffolding - in progress
- RPC1 assembly fixture(s) - need RPC1 design first
- RPC1 transport/installation fixture(s) - need RPC1 design first
- MuTr vacuum lifter dummy load (for load test) - in progress
- MuTr additional lifting fixture(s) (FEM plate) - in progress
- Mu Trigger Stations 2/3 North&South access scaffolding - not yet specified
- Mu Trigger Stations 2/3 North&South Assembly/positioning/holding tool(s) - not yet specified

- Improved/upgraded VTX part(s) - not yet specified
- VTX assembly(s) - not yet specified
- FVTX support structure - in progress
- FVTX big wheels - parts to be fabricated by FVTX group, Brazing to be procured locally
- FVTX Big wheel mounts - parts to be fabricated by FVTX group
- VTX/FVTX arc cable trays and mounts - in design queue
- RPC PE&Pb/Li absorber Components (N & S) - need absorber design first
- RPC PE&Pb/Li absorber assemblies (N & S) - need absorber design first
- RPC PE&Pb/Li absorber mounting structure (N & S) - need absorber design first
- RPC1 components (N & S) - need RPC1 design first
- RPC1N assembly(s) - need RPC1 design first
- RPC1N mounting structure - need RPC1 design first
- BBCN wire management modification - in design queue
- RPC1S assembly(s) - need RPC1 design first
- RPC1S mounting structure - need RPC1 design first
- BBBS wire management modification - in design queue
- MuTr Repair/Upgrade Parts (including scaffolding) - parts to be supplied by MuTr group except scaffolding which is in progress

- MuTr Repair/Upgrade Assemblies - to be supplied by MuTr group
- MuTrigger Repair/Upgrade Parts (including scaffolding) - parts to be supplied by MuTrigger group except scaffolding which is in design queue
- Parts for Other Shutdown Work
  - Misc. Subsystem Part(s) - not yet specified
  - Gas Mixing House Maintenance and upgrade parts - not yet specified
  - PHENIX Infrastructure Maintenance and improvement parts - not yet specified
  - Gas Pad maintenance/repair/upgrade parts - not yet specified
  - PC1/DC repairs and improvements parts - not yet specified
  - IR Bridge electrical service upgrade parts - not yet specified
  - FoCal Support parts - not yet specified
  - RPC Factory Support parts - not yet specified
  - Rack room upgrades parts - not yet specified
  - CM Crane parts - project is on hold indefinitely
  - CM Alignment Stop parts - in design queue
  - Gas system maintenance/repair/upgrade parts - not yet specified
  - Future upgrade support parts - not yet specified

## Procedures for Shutdown 2011

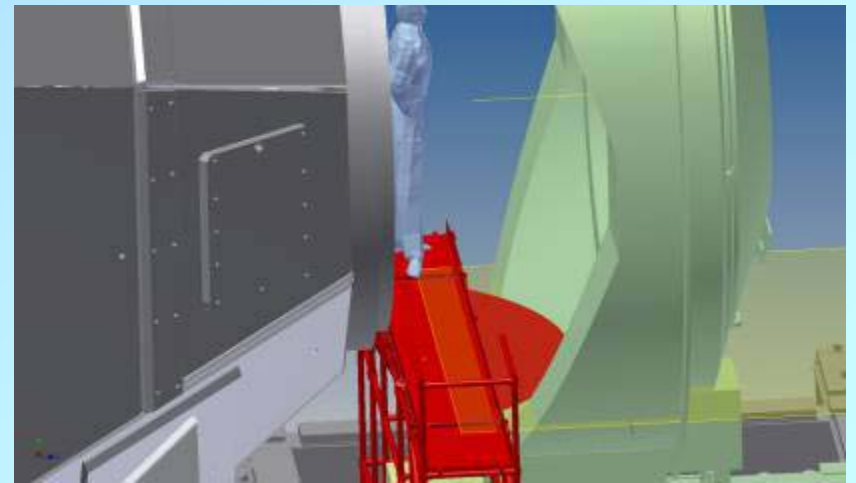
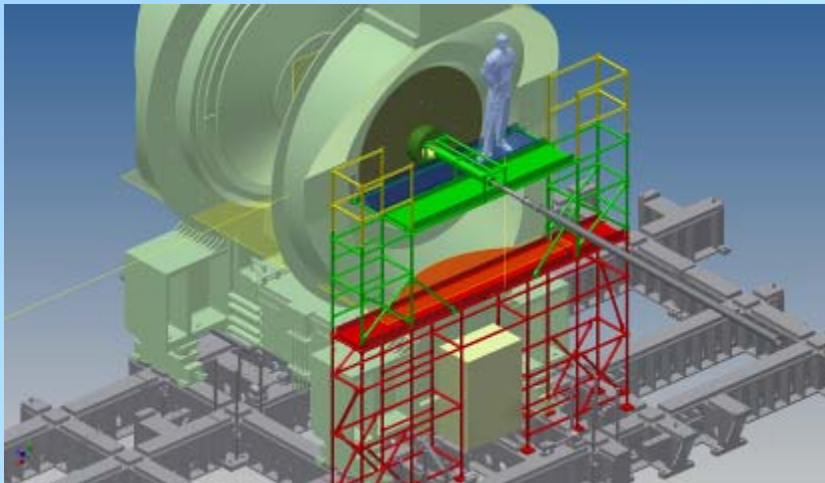
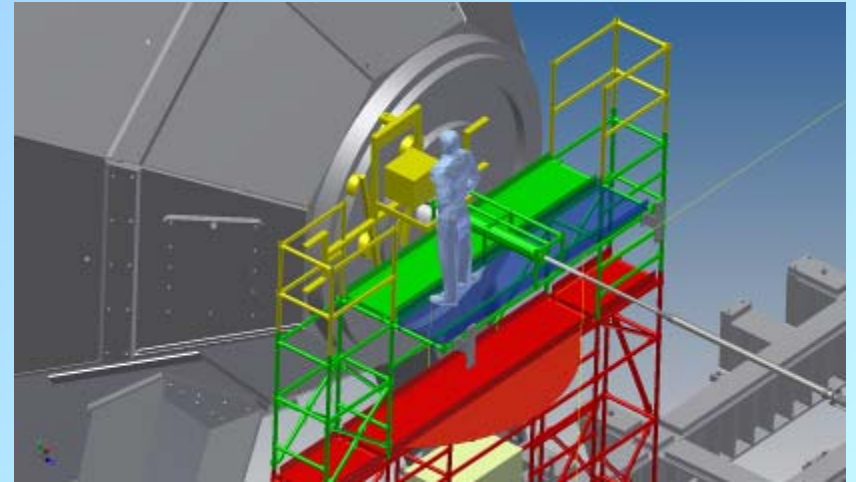
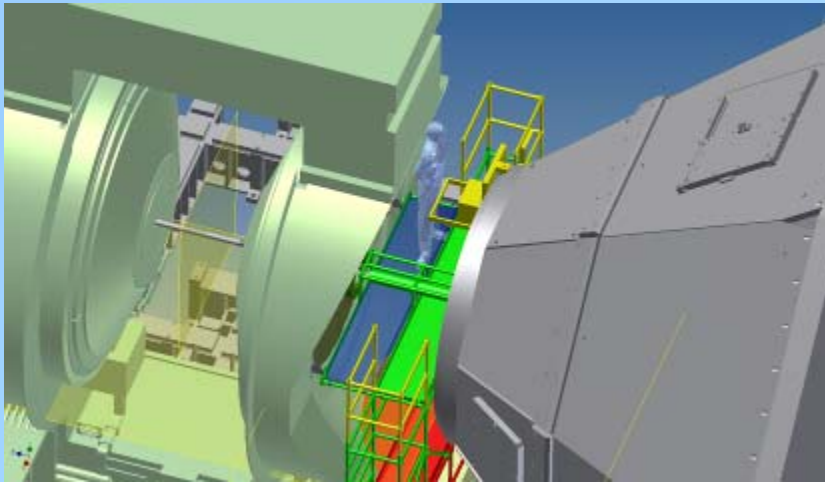
- Existing PHENIX General Purpose Recurring Task procedures
- VTX Removal
- FVTX/VTX installation
- VTX Survey
- FVTX Survey
- FVTX Cooling System
- RPC borated PE/Pb or Li Absorber
- RPC1 Installation/QA testing/Survey
- MuTr Maintenance & Upgrade
- MuTrigger Maintenance and Upgrade

## Work Permits for Shutdown 2011

- Start of Shutdown
- VTX Removal
- FVTX/VTX Installation
- MuTr Maintenance and Upgrade
- RPC Absorber Upgrade
- RPC1 Installation
- MuTrigger Maintenance and Upgrade
- End of Shutdown

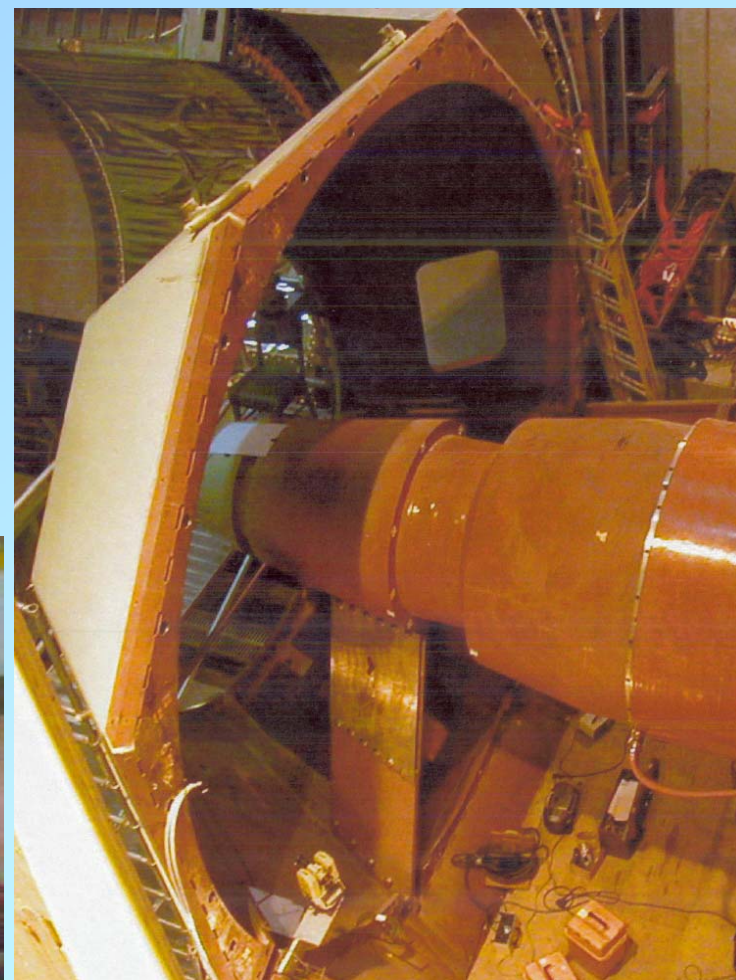
# MuTr & RPC1 Work platform/scaffold

TECHNICAL SUPPORT









Station 2 access (MMS shown  
MMN is similar)

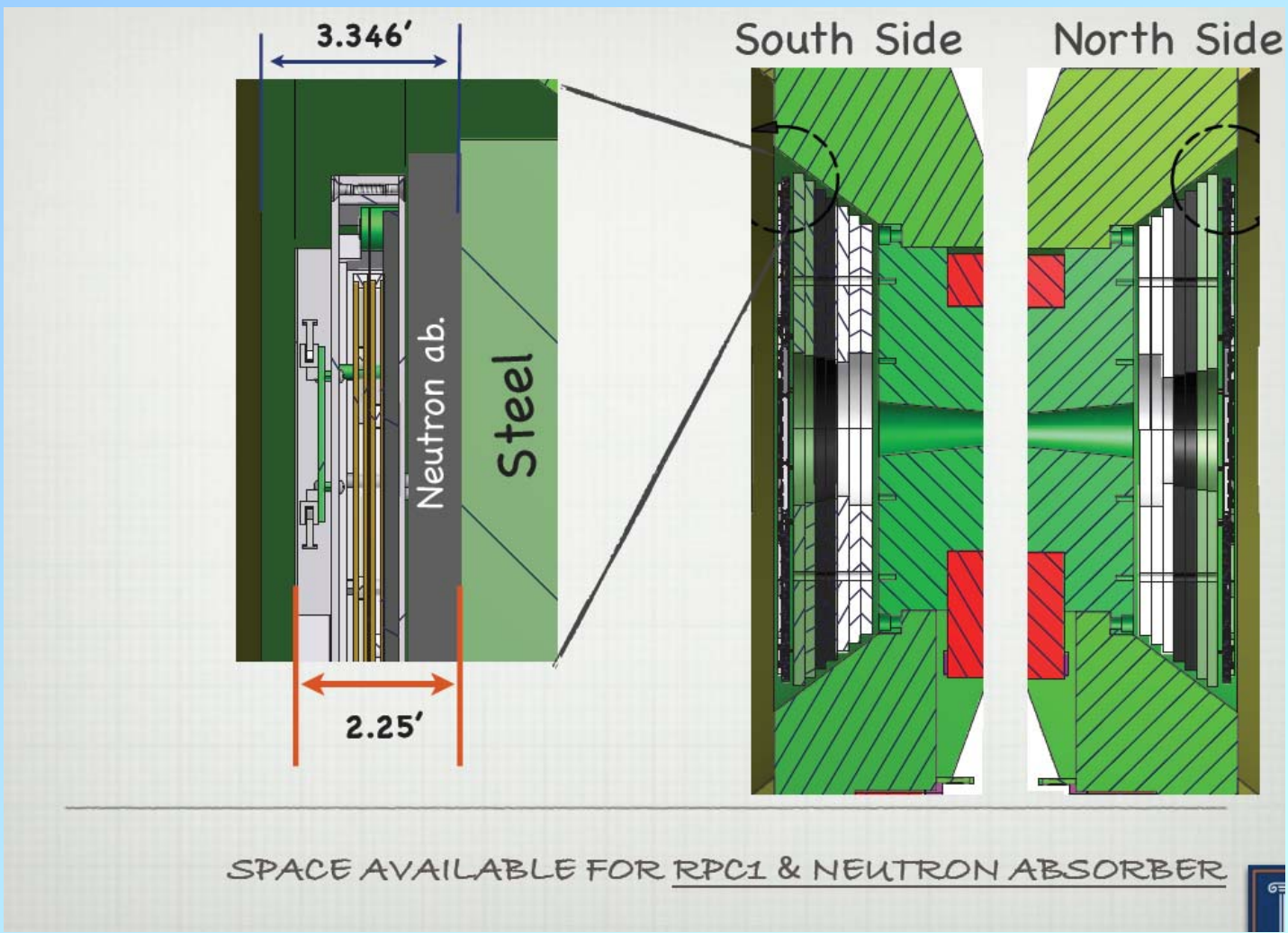


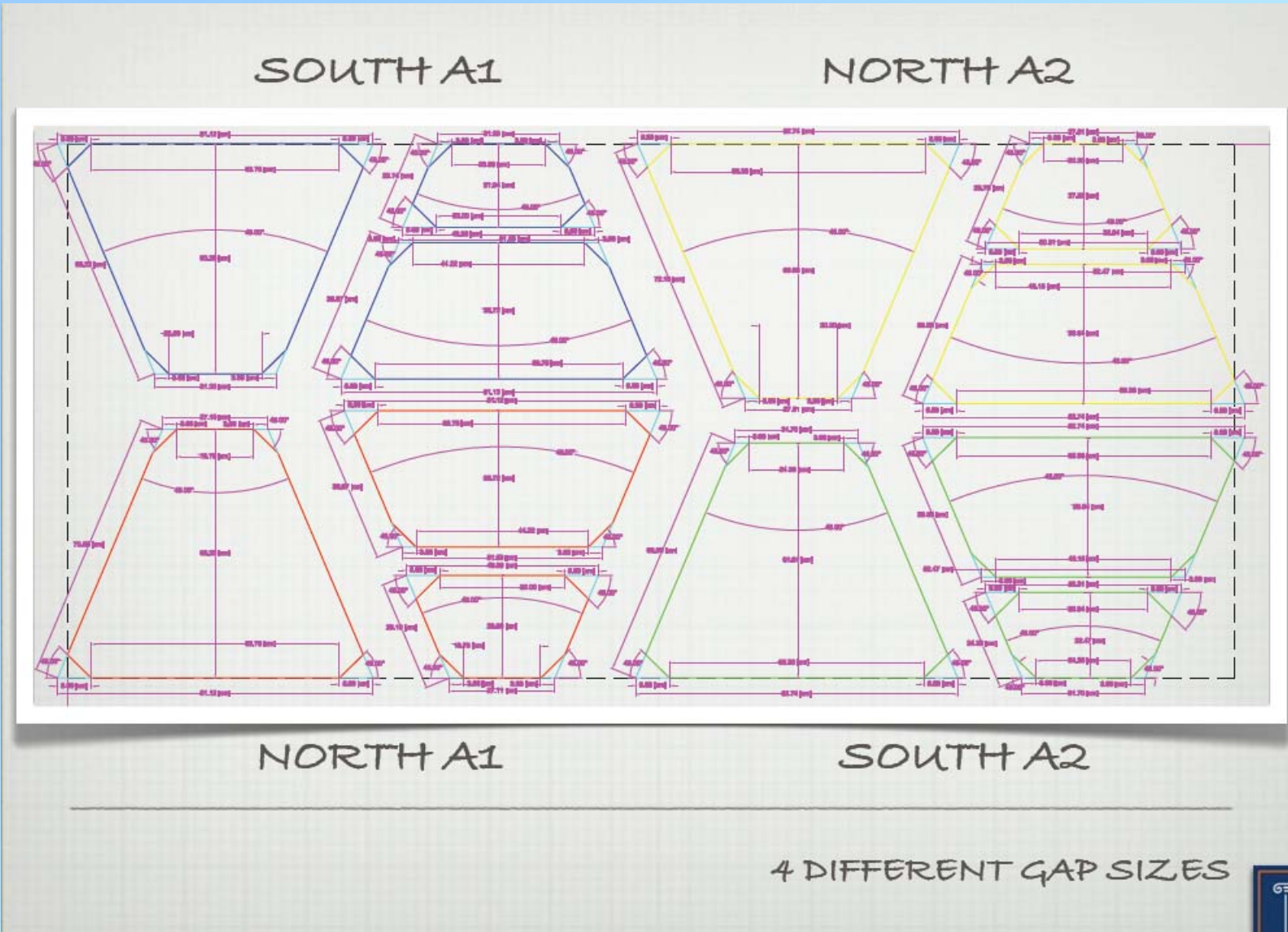
MuTr station 1 lifting fixture

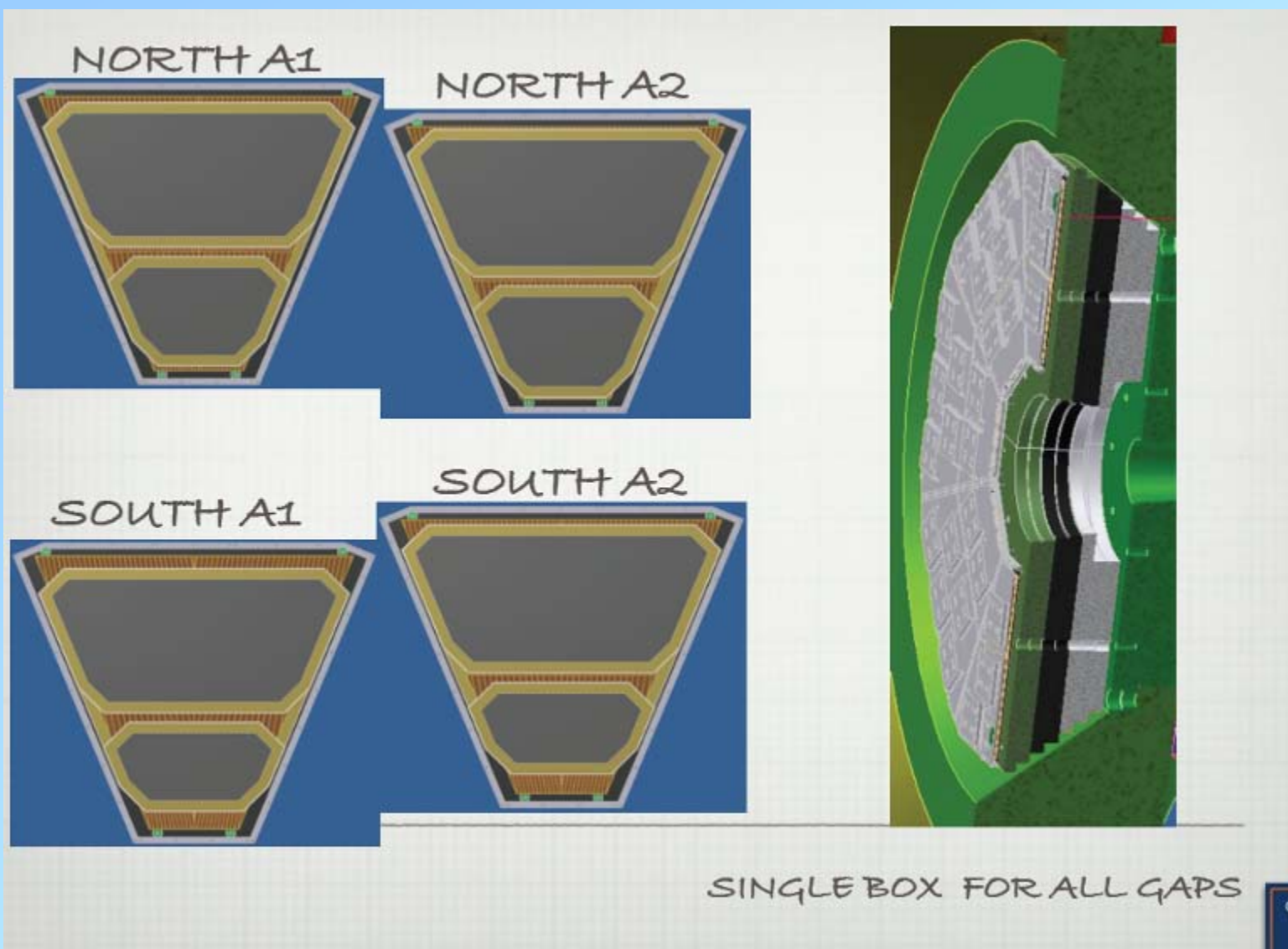




# RPC1 Design including Thermal Neutron Absorber (Slides from yesterday's DC meeting by Francesca Giordano)

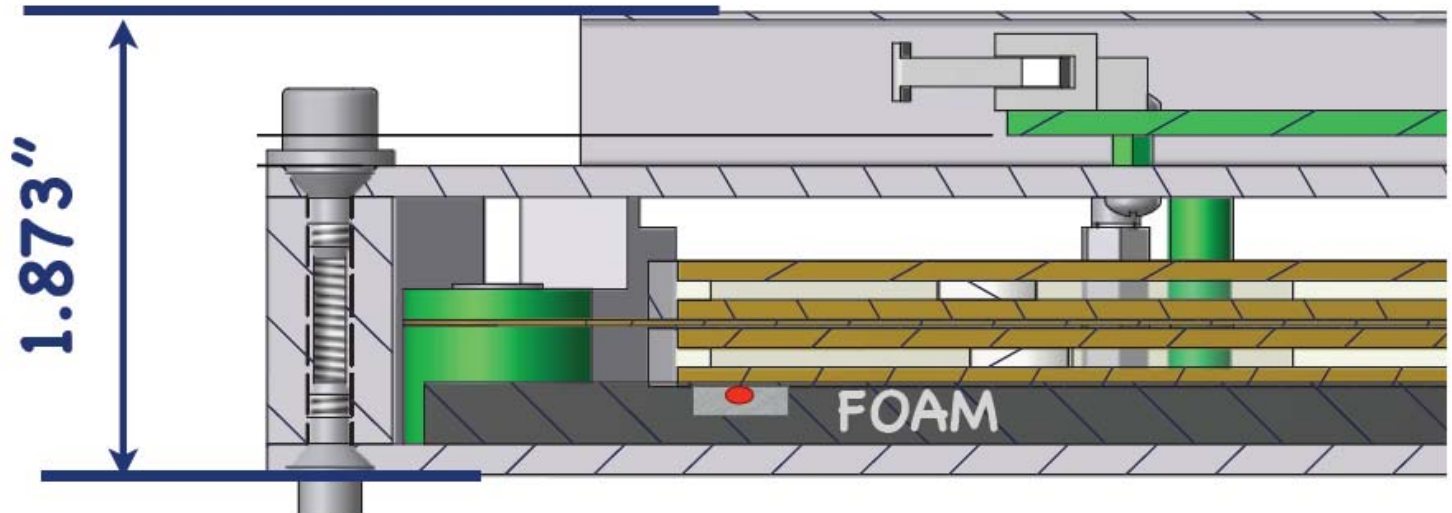








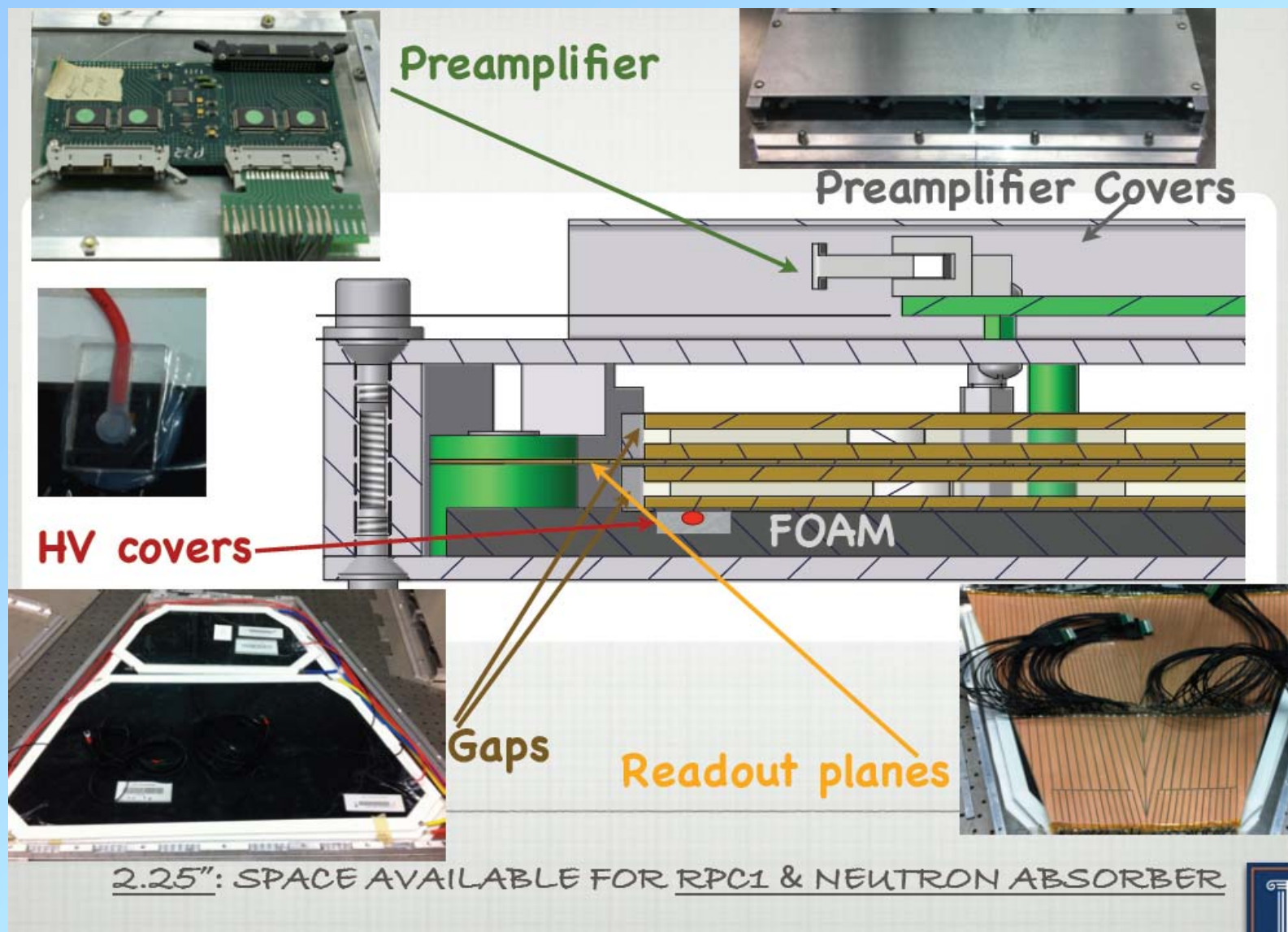
Minimum thickness needed for  
RPC1: 1.873"



Left thickness for Neutron absorber: 0.38"

2.25": SPACE AVAILABLE FOR RPC1 & NEUTRON ABSORBER





- Easier fabrication >> cheaper

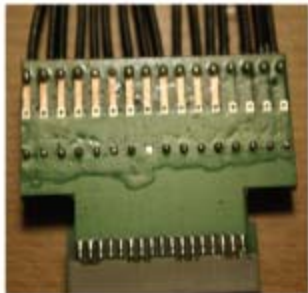
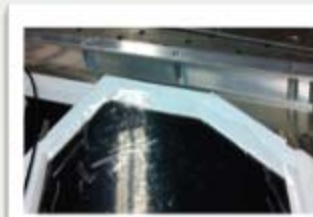
(No Honeycomb, but Al)

- Easier to build:

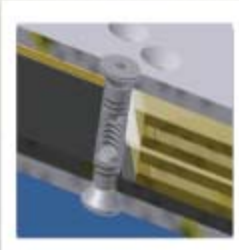
(C-shaped borders)

- Less noise?

(Fewer holes, Single ground bar, Conformal coating of signal cables soldered)

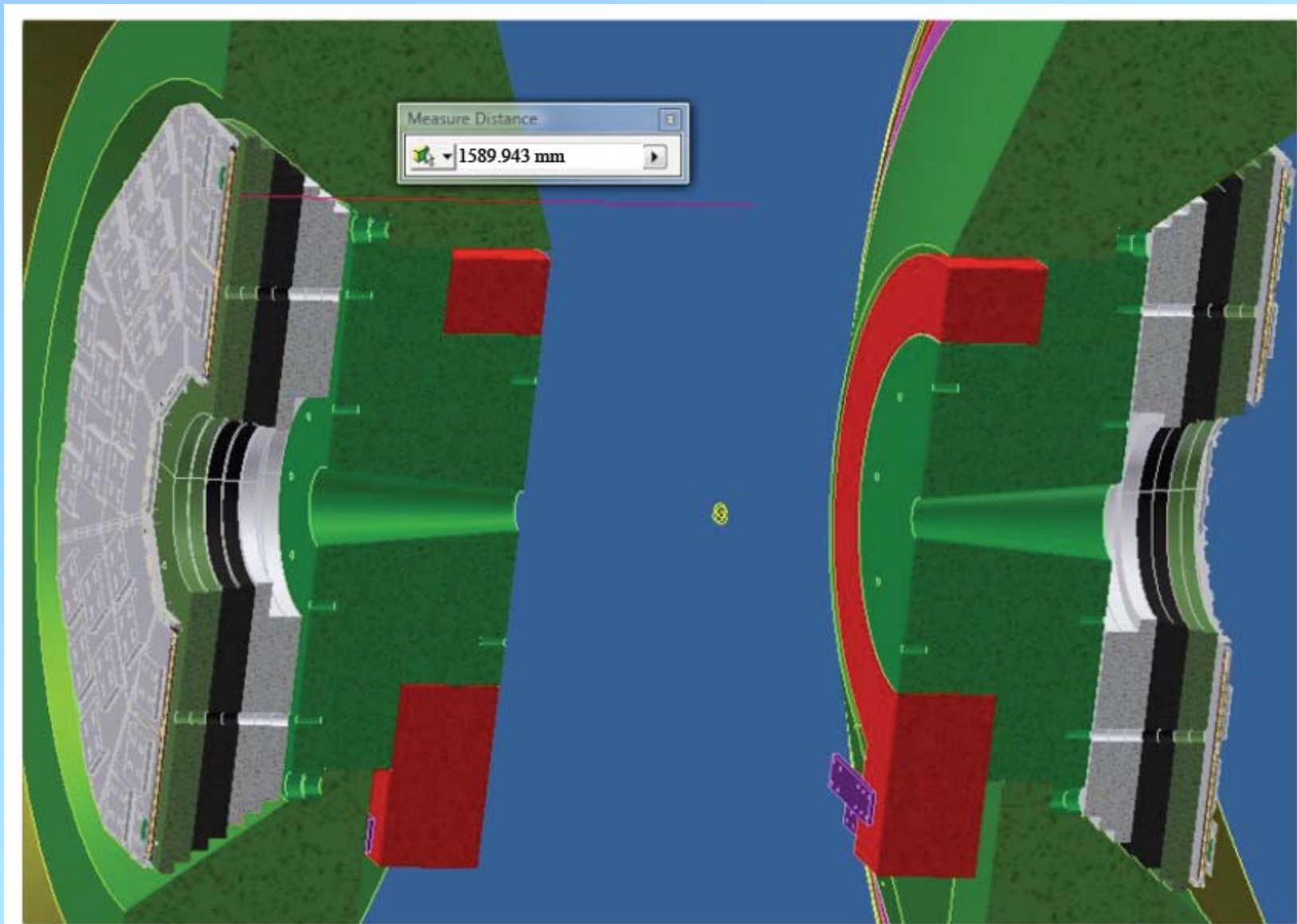


- Positioning pin for readout planes



- Positioning screw for the gaps

BOX DESIGN (DAVID NORT HACKER, JOHN BLACKBURN)





	Neutron absorption Cross section (barn)
B-10	3837.00
Li	70.50
<sup>6</sup> Li	940.00

I) BORATED PE + LEAD

II) CARBONATED LITHIUM ( $\text{Li}_2\text{CO}_3$ )

III) CARBONATED ENRICHED LITHIUM -<sup>6</sup>Li- ( $\text{Li}_2\text{CO}_3$ )

THICKNESS FOR NEUTRON ABSORBER: 0.38" (0.97 CM)

CARBONATED LITHIUM ( $\text{Li}_2\text{CO}_3$ )

- comes (most likely) as powder

\* Box needed

Incompatible with Al >> Brass ?

1mm layer box >> 0.97 cm - 2x0.1 cm = 0.77 cm

\* How to avoid inhomogenities and movement?

Inner stiffening structure (ribs?) used also as baffles?

\* How to fill the box?

\* Safety concerns: not flammable, but affect health if swallowed

Braze/solder the Brass box?

Would need a dedicated area for assembly >>  
build them in Urbana and send sealed at BNL?

THICKNESS FOR NEUTRON ABSORBER: 0.38" (0.97 CM)

I) BORATED PE + LEAD

★ t=1.27cm (0.5") 99% absorption

★ t= 0.5 cm 85% absorption

+ 1 cm lead to absorb gamma rays!!!

BORATED PE + LEAD

WOULD NOT FIT THE SPACE AVAILABLE

THICKNESS FOR NEUTRON ABSORBER: 0.38" (0.97 CM)

II) CARBONATED LITHIUM ( $\text{Li}_2\text{CO}_3$ )

★ t= 0.77 cm 80% absorption

III) CARBONATED ENRICHED LITHIUM -<sup>6</sup>Li- ( $\text{Li}_2\text{CO}_3$ )

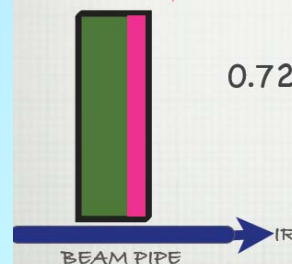
★ t= 0.15 cm >99% absorption !!

<sup>6</sup>Li is very expensive, but in Urbana we have ~9 Kg

★ t= 0.05 cm 80% absorption

0.72cm Li + 0.05cm <sup>6</sup>Li > 95% absorption

Natural Li ~100Kg (~\$4000)



THICKNESS FOR NEUTRON ABSORBER: 0.38" (0.97 CM)

◆ FINALIZE THE BOX DESIGN, ORDER THE BOXES

\*JULY > COMPLETE RPC1 NORTH

\* SEPTEMBER &gt; COMPLETE RPC1 SOUTH

### TIME SCHEDULE

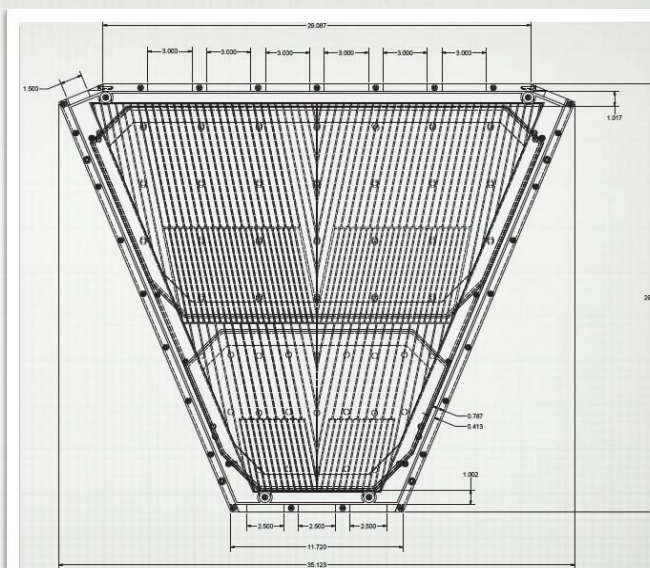
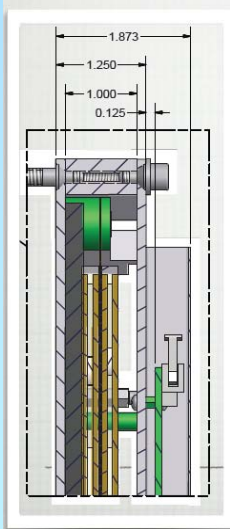
RPC1 needed purchases, April 2011				
Status	Part Name	Part Name (detail)	Quantity, including +10%	COST
1	Module Box		28	\$20,000
2	Readout plane		32	\$11,520
3	Electronics			\$10,000
4	Caen HV	HV Modules	10	\$71,428
5	Order out	Cu Foil	6 rolls	\$1,709.94
6	Order out	Signal Cable	Ribbon cable 3300m (36 packages)	\$10,954.44
	Order out	Connector	500 (5 packages)	\$2,235
	Order out	Jumper connector	300 3 packages	\$2,386.80
7	Order out	CPE cable	1000m	\$1,980.00
8	Order out	CPE Normal connector	100	\$2,267.00
9	Order out	Kapton Tape 18-2S-2-36 (36 yd x 2 in x 2 mil)	2 rolls	\$147.70
		18-1S-5-36 (36 yd x 0.5 in x 1 mil)	6 rolls	\$61.26
		TOTAL COST		\$134,686.14

PURCHASED/ORDERED

OUT FROM LIST:

- CONFORMAL COATING?
- LITHIUM?

PURCHASE STATUS



## BOX DESIGN

4/14/2011

# 2010 Building Maintenance Issues

TECHNICAL SUPPORT

- Roof leaks in utility bathroom at northwest corner behind tech offices, over door between rack room and assembly hall, over door between control room and elect. ass'y room, southeast corner of IR and laser room.
- General maintenance for Trailer Offices (in progress)  
-Repair replace floor tiling as needed
- Flooding in AH/ Driveway
- New connection

Nothing New This Week





## PHENIX Procedure Review Current Status:

### 147 Procedures Identified

- 87 Made Inactive (not currently in use, will reactivate if and when necessary, available for re-activate if
- 9 CAD procedures relevant to the experiment and available on the
- 43 PHENIX procedures
- 9 Procedures (never previously formalized) (3 are ready for re-activate these will be addressed during next few months.

**Nothing New This Week**

Web retrieval of latest procedures now available from PHENIX Internal:

[http://www.phenix.bnl.gov/WWW/INTEGRATION/ME&Integration/DRL\\_procedures.htm](http://www.phenix.bnl.gov/WWW/INTEGRATION/ME&Integration/DRL_procedures.htm)

## 1. RPC Factory annual safety review

- a) All procedures reviewed and found to be up to date requiring no revisions  
**Done except new signatures.**

Annual RPC Factory safety system blue sheet testing, **Done**  
Safety walkthru needed, schedule TBD, after blue sheets **Done**  
action items:

- 1- Inventory and place gas cylinders into Chemical Management System. Clearly post the static inventory form near the bottle racks. - **Rob/Carter**
- 2- Update and review RPC work Plan for 2011. - **Don**
- 3- Send Documentation of certification of gas safety system to C-AD ESSHQ. - **Paul**
- 4- Send Documentation to ESSHQ of environmental discharge of RPC for year 2011. - **Rob**
- 5- Repair exit sign in RPC tent. - **Paul**

## 2. FoCal Prototype safety review

- a) Documents prepared and submitted for review - **Done**
- b) Installation procedure and work permit in progress - **Waiting for prototype, now expect prototype to be ready by end of May**
- c) Assembly of prototype and design of installation/support structure in progress - **wire bonding in progress? (Fabrication Done)**
- d) Expect to install during a maintenance access period **sometime in May?**

3. One injury reported last week breaking the 3 week no injuries streak. Non-employee lacerated his head when he struck it against a valve - first aid. No new DARTS or Recordables



4. CPR Training: April 29<sup>th</sup> 26<sup>th</sup>

Carter, Rob, Frank, Chris, Kenny, Mike L., Chris P. and me.  
Anyone else wanting to get in on this training, please let me know and I'll see if we can get another slot.

## Why You Shouldn't Text & Drive

TECHNICAL SUPPORT



4/14/2011

# Where To Find PHENIX Engineering Info



At least we avoided the government shutdown

Run

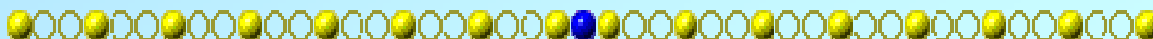
RHIC

Run

!

Links for the weekly planning meeting slides, archives of past meeting slides, long term planning, pictures, videos and other technical info can be found on the PHENIX Engineering web site:

[http://www.phenix.bnl.gov/WWW/INTEGRATION/ME&Integration/DRL\\_SSint-page.htm](http://www.phenix.bnl.gov/WWW/INTEGRATION/ME&Integration/DRL_SSint-page.htm)



4/14/2011